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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/608,724

Filing Date: June 26, 2003

Appellant(s): GUSTAFSSON, ANDREAS

Karen Kaufman
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 11/13/2007 appealing from the Office action mailed 06/08/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

2002/0178238	Fletcher et al.	11-2002
5,860,146	Vishin et al.	01-1999
6,182,136	Ramanathan et al.	01-2001
5,202,986	Nickel	04-1993

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Claims 1-9 and 11-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fletcher et al. (USPN: 2002/0178238) hereinafter, Fletcher in view of Vishin et al. (USPN: 5,860,146) hereinafter, Vishin.

As per claim 1, Fletcher teaches a caching server comprising an answer cache (i.e. the cache which stores the address information that is local within the terminal) configured to access answer information (i.e. the address information); a referral cache (i.e. the cache which stores referral information to forward the query to the remote terminal's answer cache across the communication network) configured to store referral information (i.e. the referral information); and computer instructions configured to translate a domain name into DNS information by examining the answer cache and, responsive to the results of examining the answer cache, examining the referral cache (e.g. see paragraph [0008]).

However, Fletcher does not clarify that the answer cache stored answer information in a flat data structure. Vishin, on the other hand, teaches a computer system which includes a translation lookaside buffer (TLB) (i.e. 122 in Fig. 5), similar to

claimed answer cache, for storing the address information for the local page table entries; and a remote translation lookaside buffer (RTLBB) (i.e. 160 in Fig. 5), similar to claimed referral cache, for storing the address information for the remote page table entries (e.g. see the abstract and Fig. 5). By using the hash table (i.e. the flat data structure) in answer cache as taught by Vishin, it reduces the number of memory accesses and as a result of that, it is faster than the lookup in the tree structure. Accordingly, it would have been obvious to one ordinary skilled in the art at the time of the current invention was made to implement the flat data structure in the answer cache to achieve the benefits described above.

As per claims 11, 13, 17, 26, 34 and 38-39, see arguments with respect to the rejection of claim 1. Claims 11, 13, 17, 26, 34 and 38-39 are also rejected based on the same rationale as the rejection of claim 1.

As per claim 2, the combination of Fletcher and Vishin teaches the claimed invention as described above and furthermore, Vishin teaches that the flat data structure is a hash table (i.e. 122 in Fig. 5) (e.g. see the abstract and Fig. 5).

As per claims 25, 29 and 35, see arguments with respect to the rejection of claim 2. Claims 25, 29 and 35 are also rejected based on the same rationale as the rejection of claim 2.

As per claim 19, see arguments with respect to the rejection of claims 1 and 2. Claim 19 is also rejected based on the same rationale as the rejection of claims 1 and 2.

As per claim 3, the combination of Fletcher and Vishin teaches the claimed invention as described above and furthermore, Fletcher teaches that when the

requested address information is not found at the terminal, the query from the local host is forwarded to the communication network (i.e. to the remote hosts) which stores the requested information (e.g. see paragraph [0008]). Therefore, the pointer/link has to be inherently stored/present in the local terminal cache that points to the remote hosts for the requested information. Fletcher teaches the further limitation of pointers pointing to a tree data structure (e.g. see paragraph [0005]).

As per claims 5, 20-23 and 27-28, see arguments with respect to the rejection of claim 3. Claims 5, 20-23 and 27-28 are also rejected based on the same rationale as the rejection of claim 3.

As per claim 4, the combination of Fletcher and Vishin teaches the claimed invention as described above and furthermore, Fletcher teaches that the tree data structure (i.e. the hierarchical structure) is configured to store answer information and referral information (e.g. see paragraphs [0005]-[0006]).

As per claim 6, the combination of Fletcher and Vishin teaches the claimed invention as described above and furthermore, Fletcher teaches that the caching server (i.e. the name server, 101 in Fig. 1) is also an authoritative server, i.e. a server which has the desired information (e.g. see Fig. 1).

As per claim 7, the combination of Fletcher and Vishin teaches the claimed invention as described above and furthermore, Fletcher teaches that the caching server (i.e. the name server, 101 in Fig. 1) is also a web server, i.e. the DNS server (e.g. see Fig. 1).

As per claim 8, the combination of Fletcher and Vishin teaches the claimed invention as described above and furthermore, Fletcher teaches that the referral cache is further configured to store the referral information in a hierarchical data structure (e.g. see paragraphs [0005]-[0006]).

As per claims 31 and 41, see arguments with respect to the rejection of claim 8. Claims 31 and 41 are also rejected based on the same rationale as the rejection of claim 8.

As per claim 9, the combination of Fletcher and Vishin teaches the claimed invention as described above and furthermore, Fletcher teaches that the DNS information includes an IP address (e.g. see paragraphs [0005]).

As per claims 12, 16, 18, 24, 32 and 42, see arguments with respect to the rejection of claim 9. Claims 12, 16, 18, 24, 32 and 42 are also rejected based on the same rationale as the rejection of claim 9.

As per claims 14 and 15, the combination of Fletcher and Vishin teaches the claimed invention as described above and furthermore, Fletcher teaches means for storing data in the first cache such that a time required to examine the first cache is essentially constant as a function of a number of labels comprising the domain name, i.e. the first cache is the local cache, which uses the flat data structure and since the number of cache entries to search in this flat data structure local cache is fixed/constant all the time, a time required to examine the first/local cache is essentially constant as a function of (i) a number of labels comprising the domain name and (ii) a size of the first/local cache (e.g. see paragraph [0008]).

As per claim 30, see arguments with respect to the rejection of claims 14 and 15.

Claim 30 is also rejected based on the same rationale as the rejection of claims 14 and 15.

As per claims 33 and 36, the combination of Fletcher and Vishin teaches the claimed invention as described above and furthermore, Fletcher teaches the method of storing data in a cache, the method comprising: requesting DNS information; receiving data in response to the request; classifying the response received; and storing the data received in either a referral cache or an answer cache based on the classification (e.g. see paragraphs [0005] and [0008]).

As per claim 37, the combination of Fletcher and Vishin teaches the claimed invention as described above and furthermore, Fletcher teaches that the DNS information includes a numerical address, i.e. the IP address (e.g. see paragraph [0005]).

As per claim 40, see arguments with respect to the rejection of claims 1 and 33. Claim 40 is also rejected based on the same rationale as the rejection of claims 1 and 33.

As per claim 43, the combination of Fletcher and Vishin teaches the claimed invention as described above, but none of them clearly disclose that the referral cache is separate from the answer cache. However, having multiple caches in a system/server is well-known and notorious old in the art. For example, the processor performance increases by having a separate instruction and data cache in a processor. Similarly, it would have been obvious to one of ordinary skills in the art at the time of the

current invention was made to keep the answer and referral cache separate to achieve the higher performance of the server.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

B. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fletcher in view of Vishin, further in view of Ramanathan et al. (USPN: 6,182,136).

As per claim 10, the combination of Fletcher and Vishin teaches the claimed invention as described above but does not clearly teach that the DNS information includes a Mx record. Ramanathan et al., on the other hand, teaches that by including the Mx (the mail exchange) record in the DNS information, the email messages can be easily exchanged across the hosts/web using the Mx record (e.g. see Col. 6, lines 25-41). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to modify the caching server taught by the combination of Fletcher and Vishin by including the Mx record in the DNS information as taught by Ramanathan so the email messages can be easily exchanged across the hosts/web. Therefore, it is being advantageous.

(10) Response to Argument

NOTE: In the Argument section of the Appeal Brief filed 11/13/2007, the following sub-sections merely reiterates the prosecution history of this application. Therefore, there is nothing for Examiner to respond to these sub-sections.

(I)(A)(1) on pgs. 21-27

(I)(B)(1) on pg. 36

(I)(c)(1) on pgs. 37-38

(I)(D)(1) on pg. 41

(I)(F)(1) on pgs. 43-44

(I)(G)(1) on pgs. 45-46

Appellant's Argument:

A. Vishin fails to disclose an answer cache as asserted by the Examiner.

A-1. One of ordinary skill in the art would understand "answer information" to include, for example, an Internet Protocol (IP) address provided in response to DNS request. One of ordinary skill would not expect "answer reformation" as received from an "answer cache" to include "a remote physical memory address."

A-2. The Examiner is improperly equating the RTLB of Vishin, which accesses physical memory addresses, with the answer cache of claim 1 which accesses answer information in response to a DNS request.

B. Fletcher and Vishin are not analogous art. The rejection under §103(a) is improper because the cited references are in substantially different fields of art,

and as such one of ordinary skill in the art of the invention would not look to combine the features of Vishin with those of Fletcher.

- C. The Examiner has not provided a reasonable expectation of success in combining the teachings of Fletcher and Vishin.
- D. The Examiner is improperly modifying the teachings of Vishin.
- E. The Examiner has not provided a sufficient motivation to combine Fletcher and Vishin. Further, the Appellant is unable to find any support within the cited art that use of the RTLB table of Vishin "reduces the number of memory accesses" as suggested by the Examiner.
- F. The Appellant is unable to identify any teaching in Vishin that the RTLB 160 includes a hash table. Even if one were to assume for the sake of argument that the RTLB of Vishin was a flat data structure, this flat data structure is clearly not a hash table.
- G. In rejecting claim 3, the Examiner further states "Fletcher teaches the further limitation of pointers pointing to a tree data structure (e.g. see paragraph [0005])." However, the Appellant respectfully points out that claim 3 recites that the "flat data structure includes pointers to a tree data structure" and the Examiner is citing Vishin, not Fletcher, as teaching the "flat data structure." Specifically, the Examiner cites the RTLB 160 of Vishin as teaching the flat data structure of claim 13, and the RTLB 160 is not taught to include "pointers to a tree data structure."

Examiner's response:

In response to Appellant's argument **A**, the rejection of claims 1, 11, 13, 17, 26, 34 and 38-39 under 35 USC 103(a) as being unpatentable over Fletcher in view of Vishin is proper because of the response to the Appellant's arguments **A-1** to **A-2** as shown below.

In response to Appellant's argument **A-1**, Appellant is reminded that as claim 1 is an apparatus the type of data stored in the answer cache is not and cannot be claimed, as it is non-functional descriptive material. Moreover, the Examiner sees no basis for Appellant's assertions as to what one of ordinary skills in the art would "expect" to be "answer information", as the claim does not define this information.

In response to Appellant's argument **A-2**, Examiner would like to point out that Fletcher teaches every limitation of claim 1 except the flat data structure. In other words, Fletcher does not specifically teach that the answer cache (i.e. the cache which stores the address information that is local within the terminal) stores answer information (i.e. the address information) in a flat data structure. However, this limitation is taught by Vishin. In Vishin, the RTLB (remote translation lookaside buffer, 160 in Fig. 6) stores a plurality of remote page table entries; and each remote page table entry represents a mapping between a range of physical addresses and a corresponding range of remote physical addresses. As shown in Fig. 6, the RTLB is a table, which is a flat (single-layer) data structure and not a tree (multi-layer) data structure. The plurality of remote page table entries in RTLB read on the claimed answer information.

Therefore, Examiner maintains that the combination of Fletcher and Vishin does teach each and every claimed limitation and the 103 rejection is proper.

In response to Appellant's argument **B**, Examiner respectfully disagrees with Appellant for following reasons. As admitted by Appellant and clearly recited in title and the abstract, the Fletcher prior art is within the field of network communications as the current invention. The addresses described in the present application and in Fletcher are IP addresses associated with a device on a communications network (see Fletcher [0005] and Application [0002]). These IP addresses are interpreted as addresses for accessing/addressing the remote device(s) on a network. Similarly, in Vishin, (mapping) entries stored in the RTLB are for accessing/addressing remote physical addresses (see Abstract). Therefore, Vishin is reasonably pertinent to the particular problem with which the inventor was concerned. Hence, Fletcher and Vishin are analogous art.

In response to Appellant's argument **C**, as correctly pointed out by Examiner in the remarks section of the Final office action mailed on 06/08/2007, Fletcher does disclose that (i) a terminal caches the address information in paragraph [0008]; and (ii) the terminal converts the domain names into the DNS information (i.e. the IP addresses, paragraph [0005]). Fletcher further discloses that the answer information (i.e. DNS information/IP addresses) is stored across multiple DNS servers in a hierarchical/tree structure (see paragraph [0005]). However, Fletcher failed to disclose that the answer information (i.e. DNS information) is stored in a flat data structure. As discussed at length above, Vishin, on the other hand, teaches storing mapping entries in the RTLB

for accessing/addressing remote physical addresses (see Abstract); and as shown in Fig. 6 the RTLB is a table, which is a flat (single-layer) data structure and not a tree (multi-layer) data structure.

In response to Appellant's argument D that Examiner is improperly modifying the teachings of Vishin, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In the instant case, it would have been obvious to one ordinary skilled in the art at the time the current invention was made to implement the flat data structure in the answer cache because using the hash table (i.e. the flat data structure) used in RTLB in answer cache as taught by Vishin, reduces the number of memory accesses and as a result of that, it is faster than the lookup in a tree structure. Examiner would like to introduce the Nickel reference (USPN: 5,202,986) as evidentiary support of the above motivation. The Nickel reference clearly discloses that a tree data structure being as "flat" as possible reduces the access time (see Col. 5, line 63 - Col. 6, line 12).

In response to Appellant's argument E that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation for the rejection is found in the knowledge generally available to one of ordinary skill in the art. As discussed above, Nickel provides clear evidence that a tree data structure being as "flat" as possible reduces the access time (see Col. 5, line 63 - Col. 6, line 12). Using the known technique of flat data structure for reducing the access time to access/search the answer information in the answer cache of the Fletcher reference would have been obvious to one of ordinary skill.

In response to Appellant's argument F, Examiner does not agree with Appellant because a hash table is nothing but a table that associates keys with values. So for a given key an associated value can be looked-up using this "hash" table. In Vishin, the RTLB 160 is a flat data structure (i.e. not a multi-level tree structure) and by using it, a remote physical address can be looked-up for a given physical address since the mapping between these two types of addresses is stored in the RTLB (see abstract).

In response to Appellant's argument G, Examiner would like to point out that the test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In other words, when a claim is rejected as obvious under reference A in view of reference B, that does not mean that the component(s) or structure(s) of reference A must be capable of being replaced with the component(s) or structure(s) of reference B. As discussed by the Supreme Court in *KSR International*

Co. v. Teleflex Inc., 550 U.S.---, 82 USPQ2nd 1385 (2007). "A person of ordinary skill in the art is also a person of ordinary creativity, not an automaton". A person of ordinary skill in this art would readily know how to implement pointers in the flat data structure taught by Vishin.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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